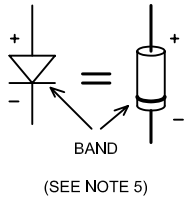
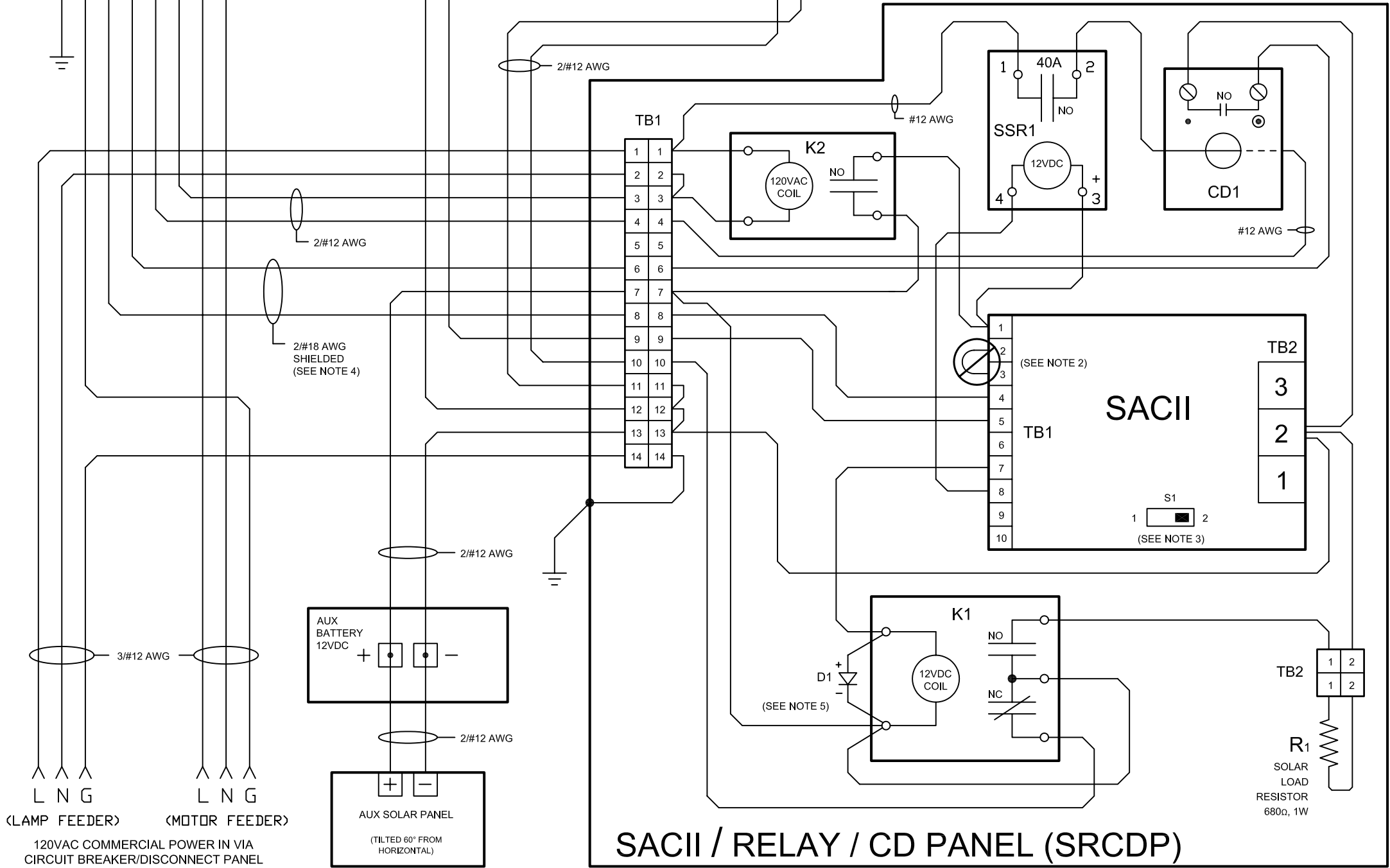


NOTES:

1. USE TERMINAL 12 FOR DCB-24; TERMINAL 10 FOR DCB-224.
2. JUMPER BETWEEN TB1-2 AND TB1-3 ON THE SACII MUST BE REMOVED.
3. SWITCH S1 ON THE SACII MUST BE IN POSITION "2."
4. USE SHIELDED WIRING BETWEEN DCB's ROTATION DETECTOR TERMINALS 23 & 25 AND SRCDP TERMINALS TB1-6 & -8.
5. USE ANY STANDARD 1N400X SERIES SILICON RECTIFIER DIODE TO PROTECT THE SYSTEM FROM DANGEROUS BACK EMF VOLTAGE SPIKES. PLEASE EXERCISE EXTREME CAUTION WHILE ORIENTING AND INSTALLING THE DIODE.
6. ALL WIRING INTERNAL TO THE SRCDP #18 AWG UNLESS NOTED OTHERWISE.

BILL OF MATERIALS			
ITEM	TYPE	SOURCE OF SUPPLY	QTY
SACII / RELAY / CD PANEL (SRCDP)	NEMA 4X ENCLOSURE w/MOUNTING PANEL	COMMERCIAL	1
TERMINAL BLOCK TB1	14 POS, BARRIER, DOUBLE ROW	COMMERCIAL	1
TERMINAL BLOCK TB2	2 POS, BARRIER, DOUBLE ROW	COMMERCIAL	1
SOLAR AID CONTROLLER II	SACII	G-SEC	1
RELAY K1	FORM SPDT, 10A, 12VDC COIL (120Q)	COMMERCIAL	1
DIODE D1	1N400X SERIES	COMMERCIAL	1
RESISTOR R1	680 OHM, 1 WATT MIN	COMMERCIAL	1
RELAY K2	FORM SPST, 1A MIN, 120VAC COIL	COMMERCIAL	1
SOLID STATE RELAY SSR1	CRYDOM P/N: D1240	COMMERCIAL	1
CURRENT DETECTOR CD1	NK TECHNOLOGIES P/N: AS1-NOU-FF	COMMERCIAL	1
AUX SOLAR PANEL	20 WATT	ELC	1
AUX BATTERY	100AH, DELCO 2000	DELCO	1
MAIN LIGHT	ROTATING BEACON DCB-24 or DCB-224	G-SEC	1
MAIN LAMPS	120VAC, 1000 WATT	ELC	2 or 4
PHOTORESISTOR	L	ELC	1
EMERGENCY LIGHT	300mm	TIDELAND SIGNAL CORP.	1
EMERGENCY LAMPS	12VDC, 2.03A	ELC	6
LAMPCHANGER, 12VDC	CG-6P	ELC	1
SPECIAL RHYTHM FLASHER	CG-181	C-R CONTROL SYSTEMS, ACSI, OR NIS (FORM. MES)	1
PHOTORESISTOR	C	ELC	1



REV.	DATE	APPR.	DESCRIPTION	BY
DESIGNED: KA			U.S. COAST GUARD	HEADQUARTERS
DRAWN: KA			OCEAN ENGINEERING	
TRACED:			CAT III (120VAC)	
CHECKED:			DCB-24/224 LTHSE SYS	
REVIEWED BY:			(Solar Back-Up - D14 Std)	
PROJECT ENGINEER				
REVIEWED BY:				
JTG				
G-SEC-2A				
REVIEWED BY:				
APPROVED:			H. R. CLEVELAND	DATE 3/4/05
UNLESS OTHERWISE SPECIFIED:			DRAWING NUMBER	
ALL DIMENSIONS ARE IN INCHES.			130431	
TOLERANCES: DIM. ANG.			SCALE: NONE	SHEET 1 OF 2

Theory of Operation:

This simplified 120VAC Category III lighthouse system is designed to provide a reliable light signal to the mariner by offering an independent solar powered backup light system. Under normal conditions when commercial power is available relay K2 energizes and powers the SACII. The SACII, in turn, energizes the solid state relay SSR1 during darkness to turn on the main light. Current detector CD1 senses 120VAC Line current drawn by the main light’s lamp(s) and provides a ground to the rotation detector installed in the main light. The “AND” logic of the current/rotation combo is then transmitted to the SACII at TB1-4. As long as commercial power is available, and the main light has not failed, the SACII will keep the system in the primary (that is, normal) mode of operation with the main light enabled (and on, if at night) and the emergency light disabled (by energizing and keeping relay K1 energized).

During this primary (normal) mode of operation, the solar backup power circuit, comprised of the 20W solar panel and 100AH battery, remains in standby mode. To keep the auxiliary battery from overcharging and the system in balance during standby a small amount of energy must be dissipated continuously. In order to maintain this charge balance, the control system must consume 2.88 AH/day (or 120-ma continuously). This 120-ma total bleed-current is made up of SACII operating current (2-ma), K1 coil current (100-ma), and R1 current (18-ma).

In the event of failure of the main light to draw current (e.g., lamp failure) or rotate (e.g., motor failure), the SACII will release relay K1 after a delay of up to 100 seconds, which will enable the emergency light. If there is a commercial power outage, relay K2 will release immediately and disconnect power to the SACII. The SACII will then release relay K1 within a few seconds and enable the emergency light. Once enabled, the emergency light uses a separate photoresistor (type C DLC) to control its independent on/off (night/day) operation.

To achieve 24-hour rotation (desired), power to the main light motor is provided by a separate unswitched power feeder. By rotating the main light day and night, the possibility of focused sun damage to the beacon is greatly reduced.

The solar power system is designed to power the emergency light indefinitely, even though the most common failure mode (commercial power outage) is likely to last for only a short period of time. The solar power system design is based on a 2.03A lamp operated at a 10% duty cycle for 12 hours per day during emergency operation. This load profile requires 2.436 AH/day when operating. A single 100AH battery and a 20W solar panel tilted 60° from horizontal will support this load (that is, the emergency light) indefinitely.

Upon power restoration after a commercial power outage, relay K2 re-energizes and restores 12VDC power to the SACII. The SACII then resets, assumes primary mode, and begins normal ops. A SACII reset serves to bring the main light back online and simultaneously activate (energize) relay K1 to disable the emergency light.

REV.	DATE	APPR.	DESCRIPTION	BY
DESIGNED: KA			U.S. COAST GUARD	HEADQUARTERS
DRAWN: KA			OCEAN ENGINEERING	
TRACED:			CAT III (120VAC)	
CHECKED:			DCB-24/224 LTHSE SYS	
REVIEWED BY:			(Solar Back-Up - D14 Std)	
KA				
PROJECT ENGINEER				
REVIEWED BY:				
JTG				
G-SEC-2A				
REVIEWED BY:			APPROVED:	DATE
			H. R. CLEVELAND	3/4/05
			CHIEF OF DIVISION	
UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES. TOLERANCES: DIM. ANG.			DRAWING NUMBER	REV.
			130431	
SCALE: NONE			SHEET 2	OF 2